

CLAIM AMENDMENTS

1. Semiconductor structure consisting of at least one first material region (1) and a second material region (3), wherein the second material region (3) epitaxially surrounds the first material region (1) and forms an interface (2), characterized in that the materials of the first and of the second material regions (1, 3) and/ or their dimensions and/ or their dopings [[are]] being such that a Fermi-level-pinning (9) is observed at the epitaxial interface (4) of the second material region (3) situate opposite to the interface (2) of both material region (1, 3) and that the first material region (1) forms a quantum well for free charge carriers, the second material region (3) having several clamp-like surfaces provided epitaxially to each other.

2. (canceled)

3. (currently amended) The semiconductor structure according to claim [[2]] 1, characterized in that the Fermi-Level-Pinning (9) is determined by the choice of the material and/ or the dimensions and/ or the doping and or the doping profile of one or both material regions (1, 3).

4. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized in that on the second material region (3) a further material region (5) is epitaxially provided, such that Fermi-Level-Pinning is only present at the nonepitaxial interface (6) opposite to the epitaxial interface (4) between the second and the further material region (3, 5).

5. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized in that the first material region (1) has a dimension a of less than 100 nanometers in x-position, especially of 0.5 to 50 nanometers.

6. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized in that the shortest distance of the quantum well to the nonepitaxial interface (4, 6) where the Fermi-Level-Pinning is observed does not fall below the size of the depletion length d.

7. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized by

a material for the further material region (5) which is identical to the material of the first material region (1).

8. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized in that a metal is used as material for the further material region (5).

9. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized in that the materials of the first and of the second material regions (1, 3) show quasi lattice matching and are provided dislocation-free to each other.

10. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized by $\text{Al}_y\text{Ga}_{1-y}\text{As}$ and $\text{Al}_x\text{Ga}_{1-x}\text{As}$ as materials for the first or respectively second material region (1, 3) with $x > y$ for the formation of a step in the quantum well (band discontinuity).

11. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, wherein there is

a concentration of free charge carriers of at least 10^{10} cm³, particularly of at least 10^{16} cm⁻³ in the first material region (1).

12. (currently amended) The semiconductor structure according to ~~one of the preceding claims~~ claim 1, characterized in that it comprises, at least partially, metal (Schottky) electrodes (7) with gate function for the control of the charge carriers.

13. (currently amended) A transistor, laser, resonant tunnel diode or other hetero structure comprising a semiconductor structure according to ~~one of the preceding claims~~ claim 1 [[to 12]].